

in general, when dealing with a weak acid salt and weak base, it is assumed that the three reactions (hydrolysis of BH^+ , of A^- and self water autolysis) depend on each other and therefore only one degree of hydrolysis is used. in reality if the acidity constant of the base is different from that of the basicity of the acid the degree of ionization of BH^+ is different from that of A^- . Assuming that C_s is the initial concentration of the BHA salt then $(\text{BH}^+)_i = (\text{A}^-)_i = C_s$. At equilibrium $[\text{BH}^+] = C_s - x$ or for $x = C_s \alpha_1$ then $[\text{BH}^+] = C_s (1 - \alpha_1)$ and $[\text{B}] = [\text{H}_3\text{O}^+] = x$; At equilibrium $[\text{A}^-] = C_s - y$ or for $y = C_s \alpha_2$ then $[\text{A}^-] = C_s (1 - \alpha_2)$ and $[\text{HA}] = [\text{OH}^-] = y$; If x is different from y how is the pH calculated? Note that K_a of the base = $([\text{B}][\text{H}_3\text{O}^+]) / [\text{BH}^+]$ and K_b of the acid = $([\text{HA}][\text{OH}^-]) / [\text{A}^-]$ where K_a of the acid = K_w / K_b of 'acid'. Please help me.